Induction of Thermal Oscillatory Synchronization to Prevent the Melting of Materials at High Temperatures via Controlled Electrical Input

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Introduction

The creation of integuments for kinetic-energy and other indirect-fire weapons capable of resisting melting and/or disintegration due to atmospheric friction is a matter of a substantial degree of interest to researchers. In order to understand how we might help a material to resist melting at extreme temperatures (in excess of 3,000 C°,) we must first understand what it is that makes materials such as tungsten so resistant to melting.

Abstract

As a generality, cubic metals enjoy a higher melting point than, for example, rhomboid metals, which have a remarkably low melting point, due to the tendency of cubic metals to form direct alignments of electrons. These alignments stabilize molecules in two directions and allow for thermal motion to be immediately anticipated by neighboring molecules, which begin moving due to Coulomb forces, as soon as an initial molecule is moved. This movement is so seamless that it creates the appearance that nothing has happened. However, what is really transpiring when a cubic metal resists melting is that a long series of chain reactions result in an equal but opposite repulsive force which acts against the initial thermally active molecule or molecules. Surrounding molecules tend to synchronize in their thermal motion and consequently maintain the same relative position. Even when there is a great deal of motion at the micro- scale, at the macro scale, the object composed of the cubic metal appears to be solid. To put it simply, the difference between a solid and a liquid is that when solids move, they move in unison and when liquids move, they move in ways which are different from one-another. As a generality, the more precisely synchronized these movements, the higher the observed melting point.

The electroweak or “Coulomb” force is absolutely essential to this property of resistivity to melting. Although individual Coulomb effects are translated instantaneously, aggregated effects over distance take some amount of time to span from one portion of a material to another. Moreover, thermal gradients introduce an intrinsic tendency toward an imperceptible de-synchronization in this coordinated oscillation. Studies have demonstrated that when a metal approaches its melting point, it undergoes micro-level distortions even prior to reaching the per se melting point.

We might amplify the intrinsic electroweak force within the material in a number of ways, none of which are very practical. However, what might be practical would be to actively compensate for what is ultimately a measurable de-synchronization through the introduction of a modest amount of electrical current to a metallic material designed to ensure that electroweak forces are

fully synchronized. By actively synchronizing thermal oscillations throughout a material, melting may be prevented without regard to temperature.

The introduction of a modest amount of electrical current at a particular interval meant to enhance Coulomb effects, particularly near boundaries between synchronized regions (zones of melting) which continually sweep through a material over short time-scales.

Counter-intuitively, in order to combat melting, one must introduce electrons near these zones of melting wherever and whenever they are detected or inferred to exist. Although electrons introduce some modest amount of heat, they also introduce a source of electroweak repulsion which can enhance the translation of the pendulum effect of the collective electrons of the material. Electrons afford us our only practical opportunity to correct de-synchronization of thermal oscillation in any material.

In order to be effective, the electrons introduced must flow from the innermost part of the integument toward the exterior and must be fired so as to prevent the formation of “melt zones.” The zones of melting could be predicted to move from the colder, interior areas toward the hottest areas near the exterior. Pulses of electricity must be fired prior to the formation of a zone of melting in order to prevent structural damage but mustn’t be too far forward of the zone if they are to be effective.

In order to be effective, the integument must be composed of tungsten rather than ceramics, which do not conduct electricity. Although ceramics have a higher melting point, this is largely due to the glue-like consistency of ceramics at high temperatures which slows the melting process mechanically even after it has begun. Thus, it could be argued that ceramics do not truly have a higher melting point and that they merely take longer to disintegrate after melting. Unfortunately, ceramics, because they do not conduct electricity, would be unsuitable for this approach.

Tungsten, provided reinforcement with precise, timing-controlled electrical input of the aforementioned sort (most likely billions of low-voltage pulses per second) would, although exceeding its melting point, continue to oscillate in unison and, therefore, behave as a solid. As temperatures continue to increase, this electricity would be crucial both for preventing the integument from becoming de-coupled from the interior of the projectile (composed of cheaper metals) as well as preventing it from directly contacting the interior and causing catastrophic over-heating of the electronics needed to support such a function.

Conclusion

Although it would be necessary to develop a capability to anticipate where a melt-zone would form and to be able to do so with a high degree of reliability, we can make some general predictions about the dynamics of these melt-zones. Their occurrence could be expected to few and far between at temperatures which straddle the melting point and to increase in frequency as the melting point is exceeded. A near-IR LASER may be used to actively monitor for these zones as they form so that the electrical inputs may be

automatically titrated. Through exhaustive testing, the needed synchronization timing could be deduced for a variety of heating conditions.